[0075] FPC can be bonded using 0.125 thick (max) ACF to the columns and rows on either side of glass subassembly **976**. Substantially transparent PSA **914** of 0.125 thickness can be used to bond glass subassembly **976** to LCD module **910**, which can include polarizer layer **915** and liquid crystals **917**.

[0076] FIG. **10** illustrates an exemplary touch screen sensor panel stackup with columns that can be formed on the back side of a cover glass and rows that can be formed on the top side of a separate glass substrate according to one embodiment of this invention.

[0077] FIG. **10** shows window **1016** that can be formed in 0.9 PC housing **1018**. Within window **1016** can be a stack-up in which the column traces can be formed on the back side of a cover glass and row traces can be formed on the top side of a separate PET film. Substantially transparent glass subassembly **1082** can have a stackup of layers that can include, in order from top to bottom, substantially transparent AG coating **1013** (shown as a dashed line at the top of the subassembly), substantially transparent 0.5 borosilicate or aluminum silicate glass, black mask (in limited areas), and substantially transparent conductive material such as patterned ITO (15 ohm max, with 0.3 lines and 0.030 spaces) that can be formed as columns. Substantially transparent glass subassembly **1084** can have a stackup of layers that can include, in order from top to bottom, substantially transparent conductive material such as patterned ITO (15 ohm max, with 0.3 lines and 0.030 spaces) formed as columns, substantially transparent 0.5 borosilicate or aluminum silicate glass, and a continuous sheet of substantially transparent ITO (500 ohm max). The two layers of patterned substantially transparent conductive material can be of the same or different composition. Glass subassemblies **1082** and **1084** can be bonded together with substantially transparent PSA **1008**. Note that the patterned ITO layers are symbolically illustrated in FIG. **10** as dashed lines representing patterning **1064** and **1086**. Together, glass subassembly **1082** through glass subassembly **1084**, and any intervening layers, can form the touchscreen.

[0078] FPCs can be bonded using 0.125 thick (max) ACF to the back side of glass subassembly **1082** and the top side of glass subassembly **1084**. Substantially transparent PSA **1014** of 0.125 thickness can be used to bond glass subassembly **1084** to LCD module **1010**, which can include a 0.2 polarizer layer **1015** and liquid crystals **1017**. The complete assembly can then be mounted into window **1016** in housing **1018**. Note that when the complete assembly is mounted in housing **1018**, glass subassembly **1082** can be either even with or slightly recessed (0.3 Z step) from the top of the window.

[0079] FIGS. **11***a*-**11***c* illustrate various exemplary touch screen sensor panel stackups with columns and rows that can be formed on opposite sides of a single substrate according to one embodiment of this invention.

[0080] FIG. **11***a* shows an approximately 0.9 substantially transparent PC housing **1118**. Substantially transparent hard film or glass **1188** and blackmask **1190** (in limited areas) can be inserted into the mold when the housing **1118** is being injection-molded to provide a hard surface and hiding properties (where the blackmask is placed). Bonded to housing **1118** using 0.100 substantially transparent PSA **1108** can be a stack-up in which the column traces and row traces can be formed on opposite sides of a single substrate. Substantially transparent glass subassembly **1176** can have a stackup of layers that can include, in order from top to bottom, substantially transparent conductive material such as patterned ITO (15 ohm max, with 0.3 lines and 0.030 spaces) formed as columns, substantially transparent 0.5 borosilicate or aluminum silicate glass, and substantially transparent conductive material such as patterned ITO (75 ohm max, with 5.0 lines and 0.050 spaces) formed as rows. The two layers of patterned substantially transparent conductive material can be of the same or different composition. Note that the patterned ITO layers are symbolically illustrated in FIG. **11***a* as dashed lines representing patterning **1178** and **1180**.

[0081] FPCs can be bonded using 0.125 thick (max) ACF to the columns and rows on either side of glass subassembly **1176**. Substantially transparent PSA **1114** of 0.100 thickness can be used to bond glass subassembly **1176** to LCD module **1110**, which can include polarizer layer **1115** and liquid crystals **1117**.

[0082] FIG. **11***b* is similar to FIG. **11***a*, except that hard film or glass and blackmask are not formed in the housing **1118**.

[0083] FIG. **11***c* is similar to FIG. **1***b*, except that glass subassembly **1176** is not fully laminated to LCD module **1110**. Instead, air gap **1120** can be formed between them, and a ring of Poron **1122** can be formed around the perimeter of glass subassembly **1176**.

[0084] FIG. **12** illustrates a side view of an exemplary FPC stackup according to one embodiment of this invention. FIG. **12** shows an FPC stackup for the thin wings or strips on the FPCs that can include release liner **1210**, 0.025 ACF and PSA **1208**, 0.012 via plating **1206**, 0.018 copper **1204**, 0.012 adhesive for the copper **1202**, 0.025 polyamide substrate **1212**, 0.012 adhesive for the copper **1202**, 0.018 copper **1204**, 0.012 via plating **1206**, 0.025 ACF and PSA **1208**, and release liner **1210**.

[0085] FIGS. **13***a* and **13***b* illustrate top views of an exemplary FPC design according to one embodiment of this invention. FIG. **13***a* shows an ACF-side view of the FPC that connects to the drive rows, including ACF pads **1306** at which the FPC can be bonded to the glass substrate using ACF **1302** that can be 0.5 wide and 0.025 thick. However, traces **1304** having 0.100 widths and 0.100 spacing can be bonded to the glass substrate using insulating PSA **1308** that can be 1.3 wide and 0.025 thick. FIG. **13***b* shows the non-ACF-side top view of the FPC traces that can connect to the drive rows, including traces **1304** that can be covered by insulating PSA **1308**, 0.018 thick.

[0086] FIG. **14** illustrates top views of exemplary FPC designs for connecting to the rows and columns of the sensor panel according to one embodiment of this invention. FIG. **14** shows detail of drive FPC **1402** and sense FPC **1400**, including drive flex tail **1404** and zero insertion force (ZIF) connector **1406**.

[0087] FIG. **15** illustrates a side view of an exemplary FPC stackup according to one embodiment of this invention. FIG. **15** shows FPC drive layer stackup **1500** for the thin wings or strips on the FPCs that can include 0.012 coverlay **1514**, 0.012 adhesive **1502**, 0.025 ACP **1508**, 0.012 via plating **1506**, 0.018 copper **1504**, 0.012 adhesive for the copper **1502**, 0.025 polyamide substrate **1512**, 0.012 adhesive for the copper **1502**, 0.018 copper **1504**, 0.012 via plating **1506**, 0.012 adhesive **1502**, and 0.012 coverlay **1514**.

[0088] FIGS. **16***a*-**16***c* illustrate top views of an exemplary FPC design according to one embodiment of this invention. FIG. **16***a* shows a non-ACF-side view **1600** of the FPC that can connect to the drive rows, including ACF pads **1606** having ACP of 0.025 thickness at which the FPC can be bonded to the glass substrate. However, traces **1610** having